

## **CHAPTER 2**

### **DESCRIPTION OF THE OBEY RIVER WATERSHED**

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#### **2.1. BACKGROUND.**

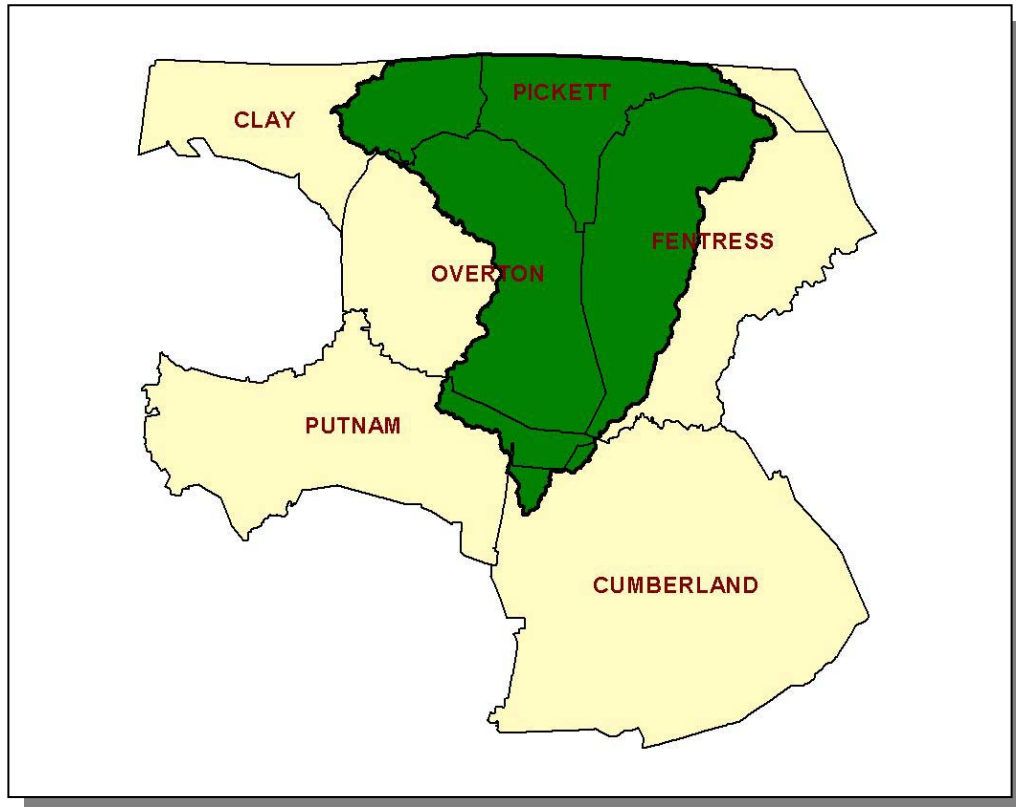
The Obey River is a tributary of the Cumberland River which has its confluence with the larger stream near the town of Celina, Tennessee. Named for Obediah Terrill, its name has changed from Obed, to Obeds, and then to Obey. The Indian name prior to this naming was Oocooahustehee, meaning good hunting.

Near its mouth, the Obey River is impounded by the U.S. Army Corps of Engineers Dale Hollow Reservoir, site of a fish hatchery run by the federal government. This dam empounds the Obey River for essentially its entire length, causing slack water well up both major tributaries, the East and West Forks. This lake is relatively deep due to the height of the dam and the depth of the gorges through which the Obey River and its tributaries flowed; the empoundment also enters Kentucky in its Wolf River and Sulphur Creek embayments.

This Chapter describes the location and characteristics of the Obey River Watershed.

## **2.2. DESCRIPTION OF THE WATERSHED.**

**2.2.A. General Location.** The Tennessee portion of the Obey River Watershed is located in Middle Tennessee and includes parts of Clay, Cumberland, Fentress, Overton, Pickett, and Putnam Counties.

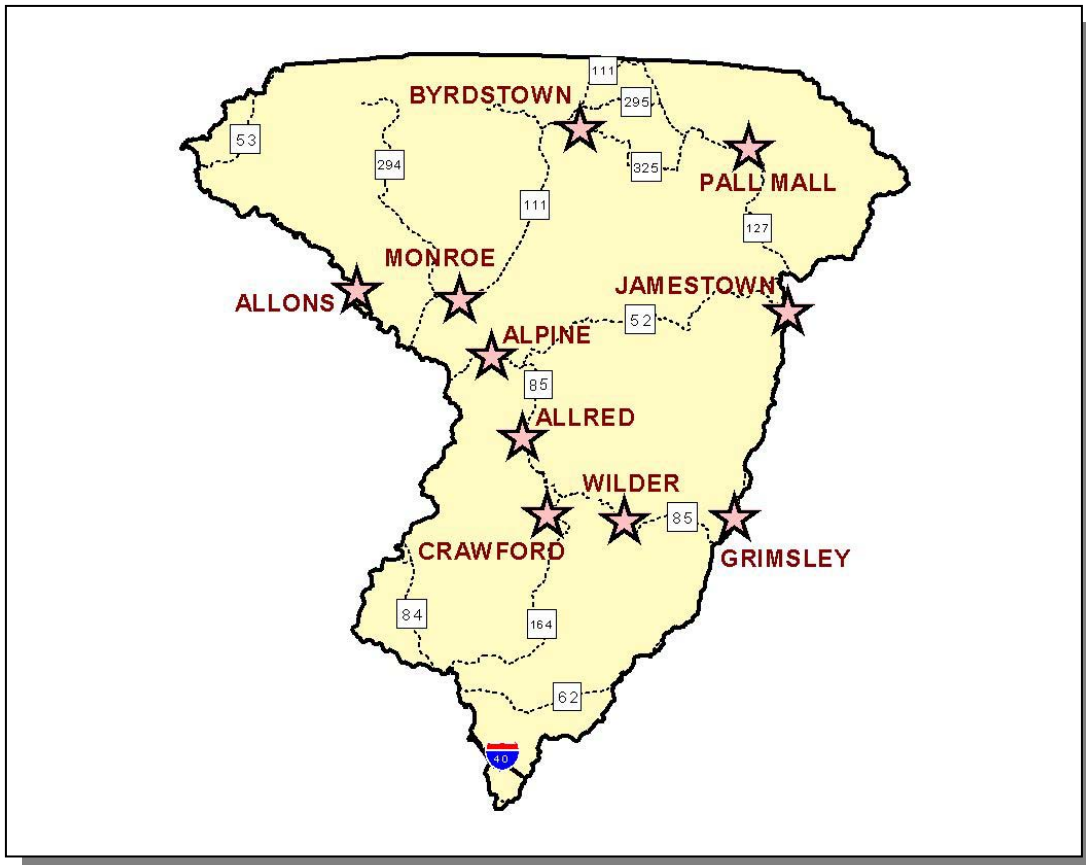


*Figure 2-1. General Location of the Tennessee Portion of the Obey River Watershed.*

COUNTY	% OF WATERSHED IN EACH COUNTY
Overton	32.7
Fentress	32.3
Pickett	18.4
Clay	10.5
Putnam	4.3
Cumberland	1.8

*Table 2-1. The Tennessee Portion of the Obey River Watershed Includes Parts of Six Middle Tennessee Counties.*

**2.2.B. Population Density Centers.** Twelve highways serve the major communities in the Tennessee portion of the Obey River Watershed.



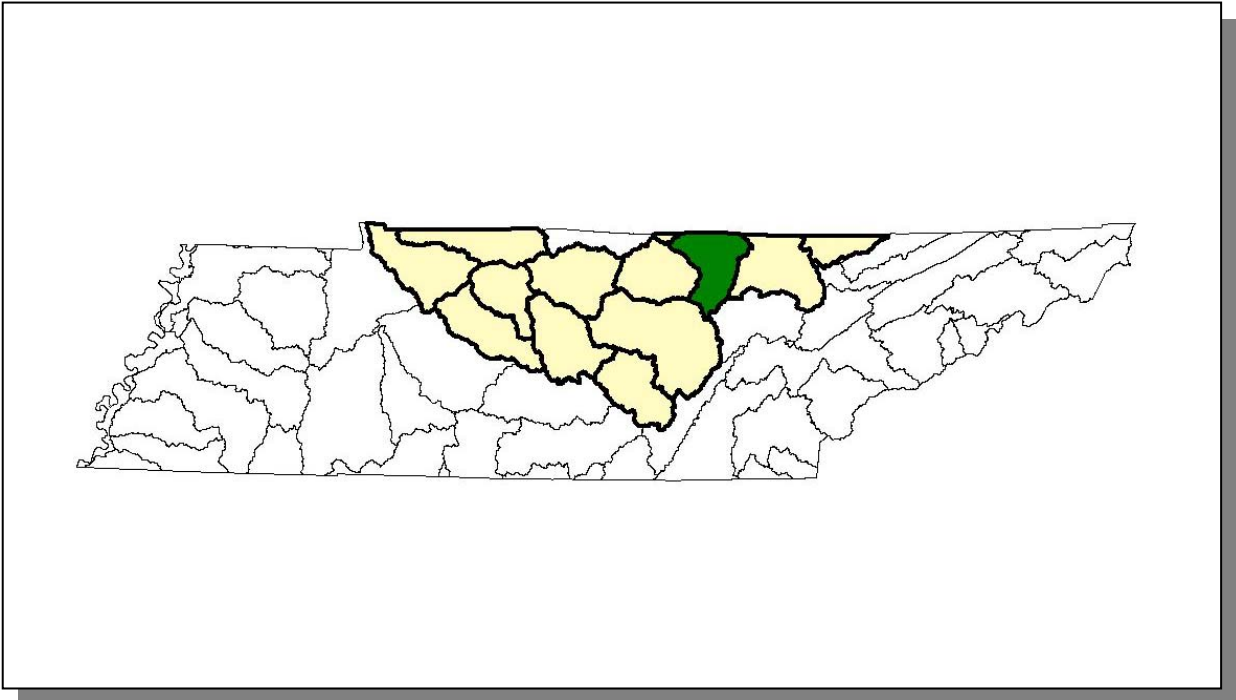
**Figure 2-2. Communities and Roads in the Tennessee Portion of the Obey River Watershed.**

MUNICIPALITY	POPULATION	COUNTY
Jamestown*	1,839	Fentress
Byrdstown*	903	Pickett

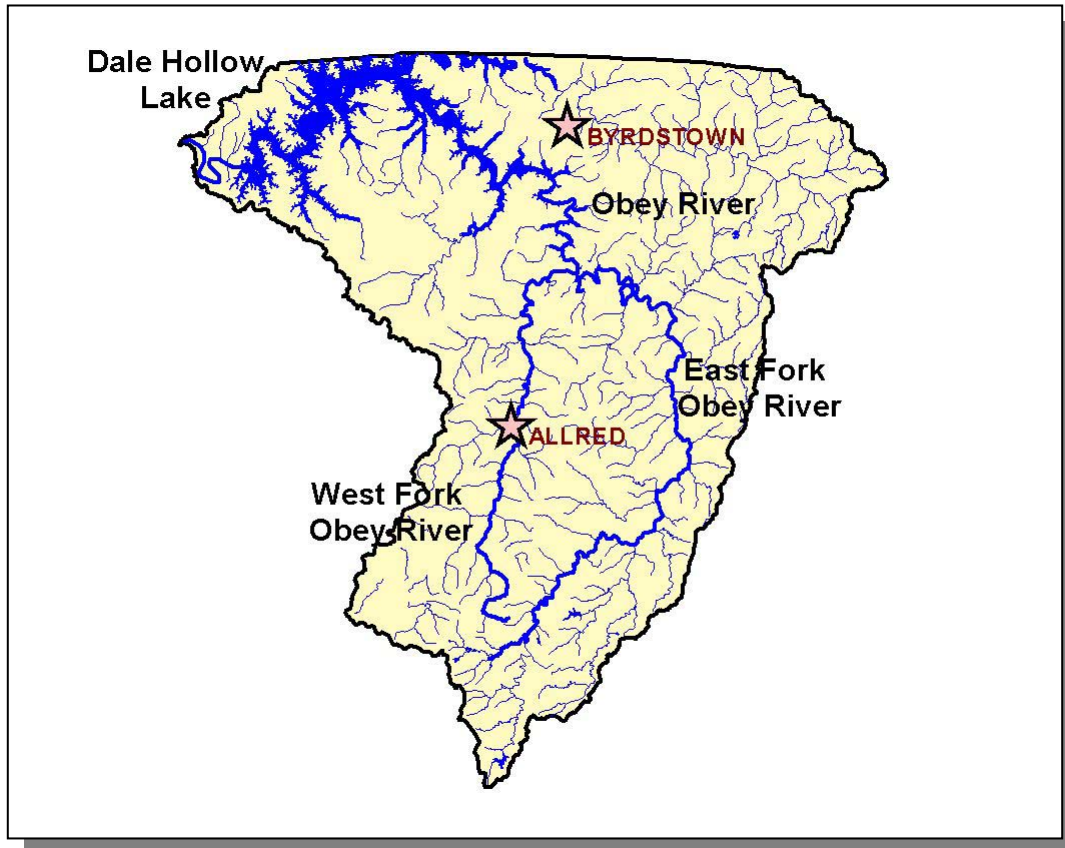
**Table 2-2. Municipalities in the Tennessee Portion of the Obey River Watershed.** Population based on 2000 census (Tennessee Blue Book) or <http://www.hometownlocator.com>. Asterisk (\*) indicates county seat.

## **2.3. GENERAL HYDROLOGIC DESCRIPTION.**

**2.3.A. Hydrology.** The Obey River Watershed, designated 05130105 by the USGS, is approximately 961 square miles (775 square miles in Tennessee) and drains to the Cumberland River.

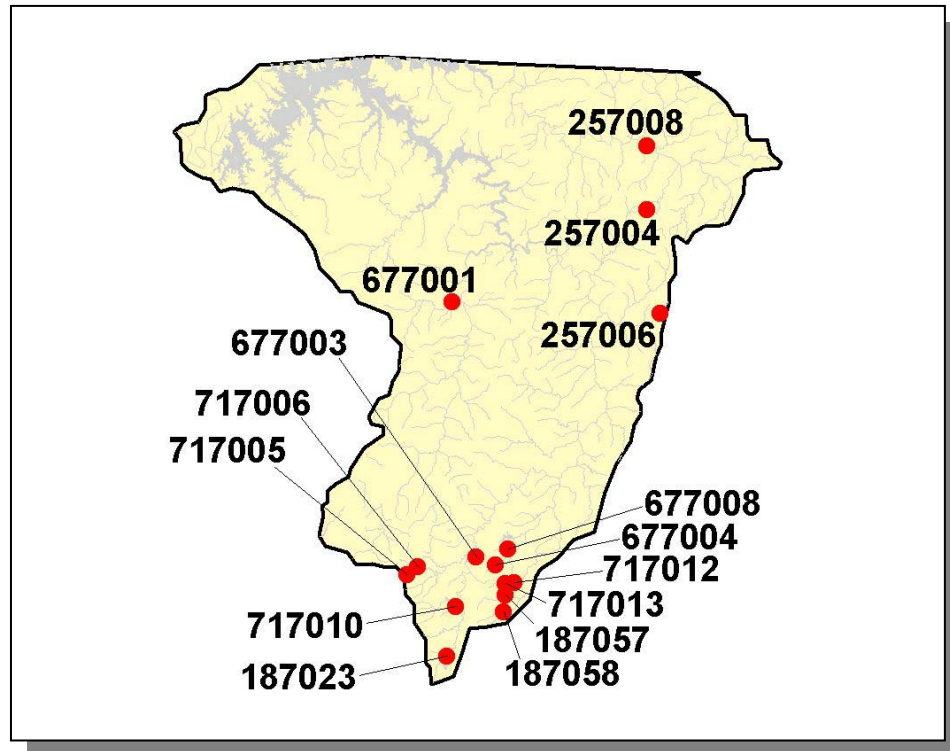


*Figure 2-3. The Tennessee Portion of the Obey River Watershed is Part of the Cumberland River Basin.*



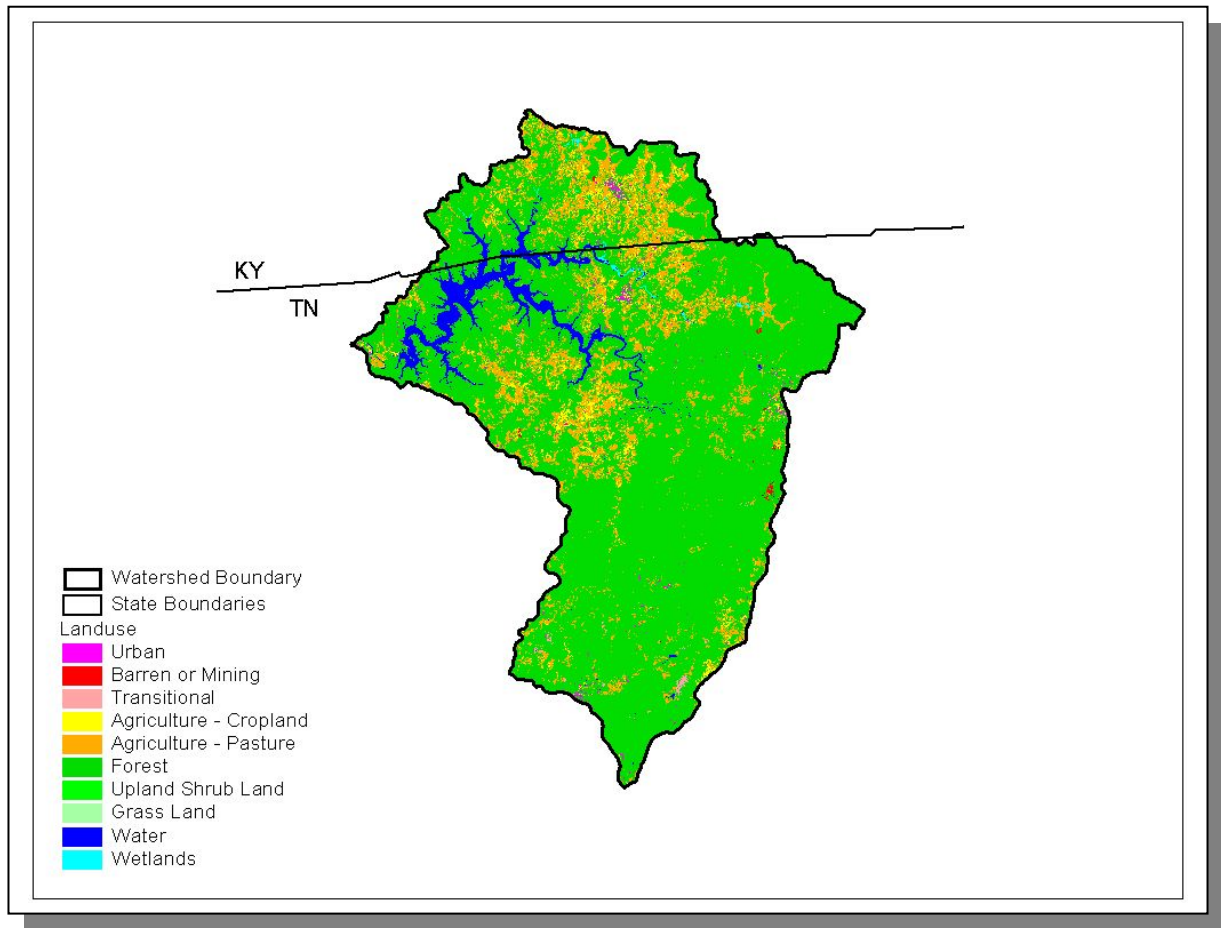
**Figure 2-4. Hydrology in the Tennessee Portion of the Obey River Watershed.** There are 776.4 stream miles and 22,000 lake acres recorded in River Reach File 3 in the Tennessee portion of the Obey River Watershed. Location of East Fork Obey River, West Fork Obey River, the Obey River including Dale Hollow Lake, and the cities of Allred and Byrdstown are shown for reference.

**2.3.B. Dams.** There are 15 dams inventoried by TDEC Division of Water Supply in the Tennessee portion of the Obey River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.



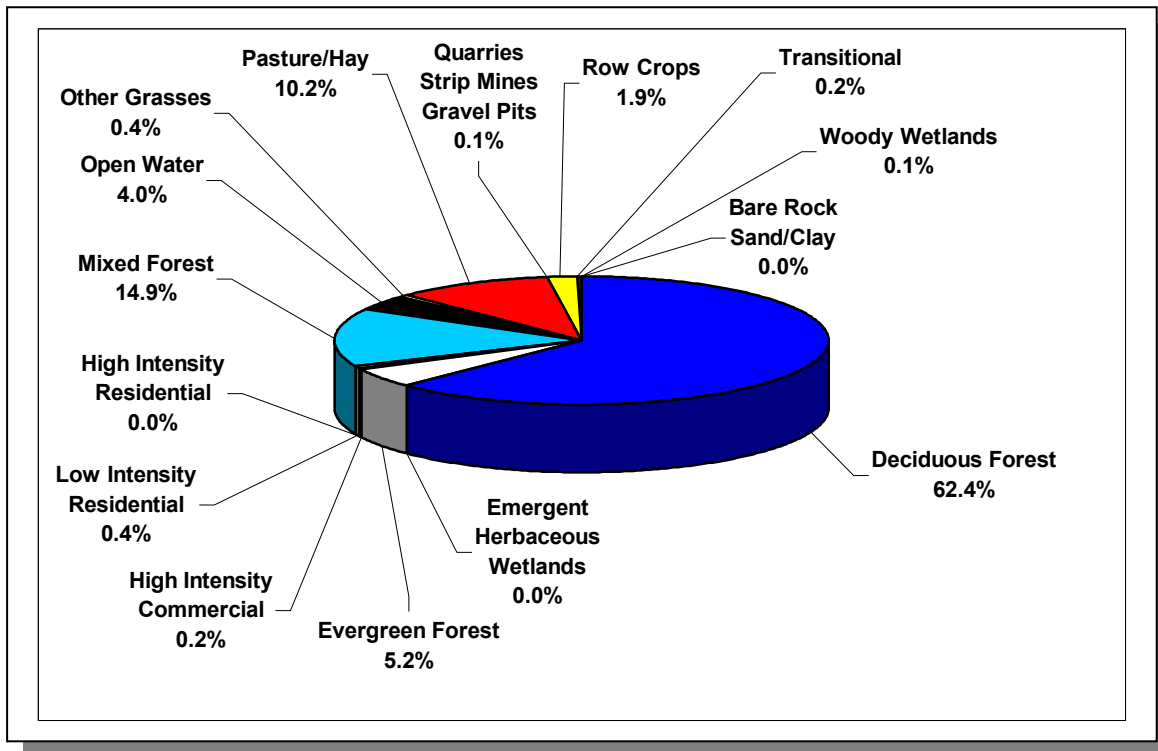
**Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Obey River Watershed.** More information is provided in Appendix II and at <http://gwidc.memphis.edu/website/dws/>.

**2.4. LAND USE.** Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.



**Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.**

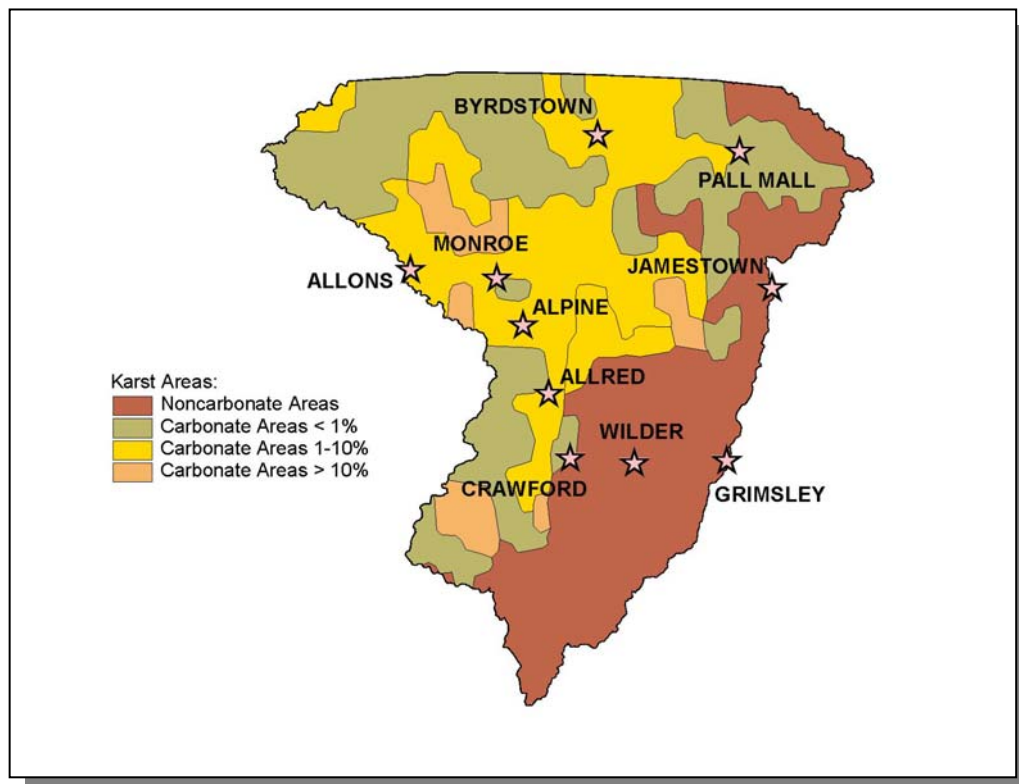
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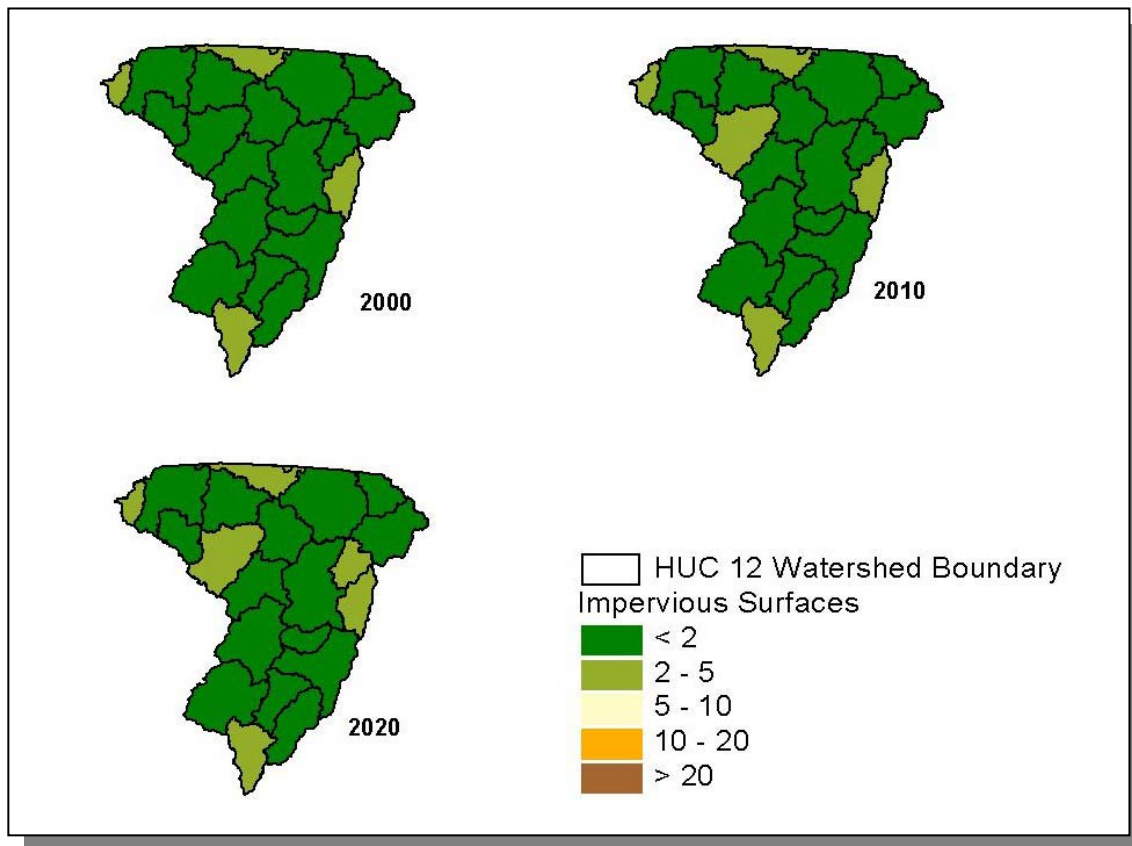
**Figure 2-7. Land Use Distribution in the Tennessee Portion of the Obey River Watershed.**  
More information is provided in Appendix II.



Sinkholes, springs, disappearing streams and caves characterize karst topography. The term “karst” describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term “karst” is named after a famous region in the former country of Yugoslavia.



**Figure 2-8. Illustration of Karst Areas in Tennessee Portion of the Obey River Watershed.**  
Locations of communities in the watershed are shown for reference.



**Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the Obey River Watershed.** All HUC-12 subwatersheds are shown. Current and projected total impervious cover is provided by EPA Region 4. More information can be found at: <http://www.epa.gov/ATHENS/research/impervious/>

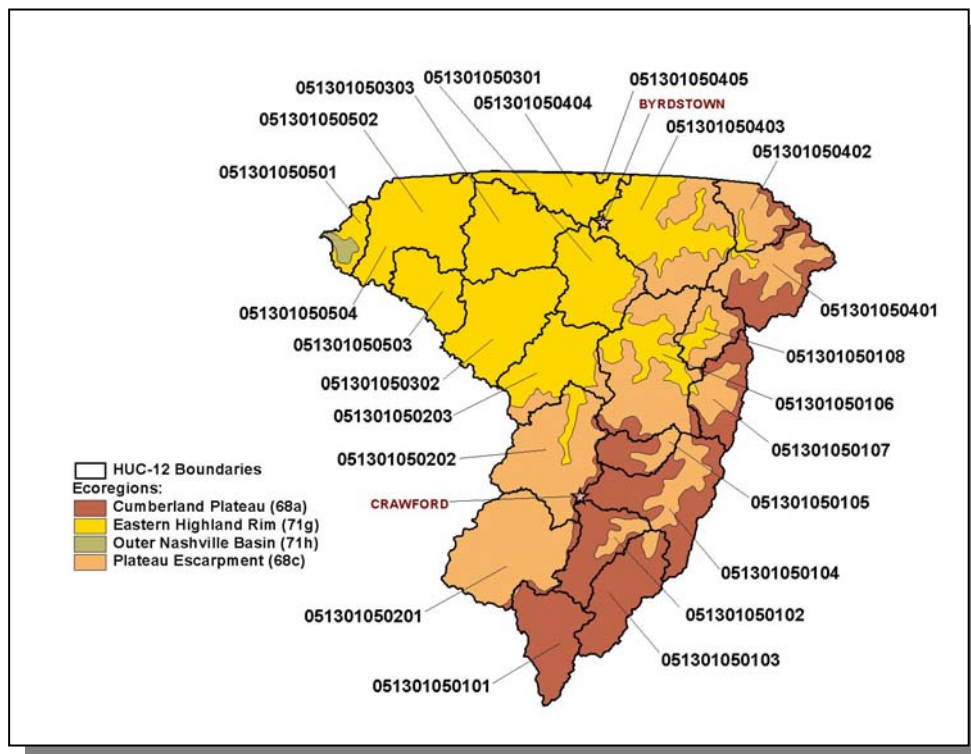
**2.5. ECOREGIONS AND REFERENCE STREAMS.** Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Tennessee portion of the Obey River Watershed lies within 2 Level III ecoregions (Southwestern Appalachians and Interior Plateau) and contains 4 Level IV subecoregions:

- The **Cumberland Plateau (68a)** tablelands and open low mountains are about 1000 feet higher than to the west, and receive slightly more precipitation with cooler annual temperatures than the surrounding lower-elevation ecoregions. The plateau surface is less dissected with lower relief compared to the Cumberland Mountains or the Plateau Escarpment (68c). Elevations are generally 1200-2000 feet, with the Crab Orchard Mountains reaching over 3000 feet. Pennsylvania-age conglomerate, sandstone, siltstone, and shale is covered by mostly well-drained, acidic soils of low fertility. The region is forested, with some agriculture and coal mining activities.
- The **Plateau Escarpment (68c)** is characterized by steep, forested slopes and high velocity, high gradient streams. Local relief is often 1000 feet or more. The geologic strata include Mississippian-age limestone, sandstone, shale, and siltstone, and Pennsylvania-age shale, siltstone, sandstone, and conglomerate. Streams have cut down into the limestone, but the gorge talus slopes are composed of colluvium with huge angular, slabby blocks of sandstone. Vegetation community types in the ravines and gorges include mixed oak and chestnut oak on the upper slopes, more mesic forests on the middle and lower slopes (beech-tulip poplar, sugar maple-basswood-ash-buckeye), with hemlock along rocky streamsides and river birch along floodplain terraces.
- The **Eastern Highland Rim (71g)** has level terrain, with landforms characterized as tablelands of moderate relief and irregular plains. Mississippian-age limestone, chert, shale, and dolomite predominate, and karst terrain sinkholes and depressions are especially noticeable between Sparta and McMinnville. Numerous springs and spring-associated fish fauna also typify the region. Natural vegetation for the region is transitional between the oak-hickory type to the west and the mixed mesophytic forests of the Appalachian ecoregions (68, 69) to the east. Bottomland hardwood forest has been inundated by several large impoundments. Barrens and former prairie areas are now mostly oak thickets or pasture and cropland.
- **Outer Nashville Basin (71h)** is a more heterogeneous region than the Inner Nashville Basin, with more rolling and hilly topography and slightly higher

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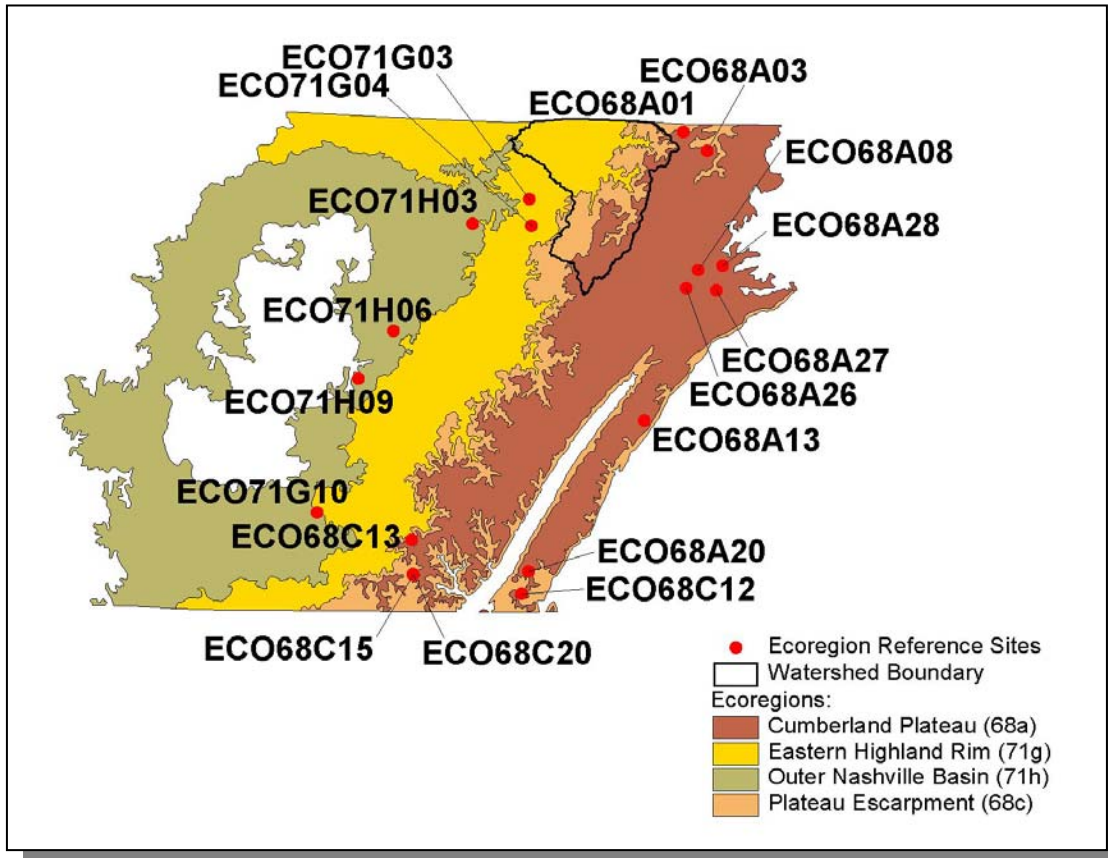
elevations. The region encompasses most all of the outer areas of the generally non-cherty Ordovician limestone bedrock. The higher hills and knobs are capped by the more cherty Mississippian-age formations, and some Devonian-age Chattanooga shale, remnants of the Highland Rim. The region's limestone rocks and soils are high in phosphorus, and commercial phosphate is mined. Deciduous forests with pasture and cropland are the dominant land covers. Streams are low to moderate gradient, with productive nutrient-rich waters, resulting in algae, rooted vegetation, and occasionally high densities of fish. The Nashville Basin as a whole has a distinctive fish fauna, notable for fish that avoid the region, as well as those that are present.



**Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the Obey River Watershed.** Locations of Byrdstown and Crawford are shown for reference.

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Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.



**Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 68a, 68c, 71g, and 71.** The Tennessee portion of the Obey River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.

## **2.6. NATURAL RESOURCES.**

**2.6.A. Rare Plants and Animals.** The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

<b>GROUPING</b>	<b>NUMBER OF RARE SPECIES</b>
Crustaceans	4
Insects	6
Mussels	4
Snails	2
Amphibians	4
Birds	5
Fish	6
Mammals	7
Reptiles	1
Plants	23
<b>Total</b>	<b>62</b>

***Table 2-3. There are 62 Known Rare Plant and Animal Species in the Tennessee Portion of the Obey River Watershed.***

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In the Tennessee portion of the Obey River Watershed, there are seven known rare fish species, four known rare mussel species, two known rare snail species, and four known rare crustacean species.

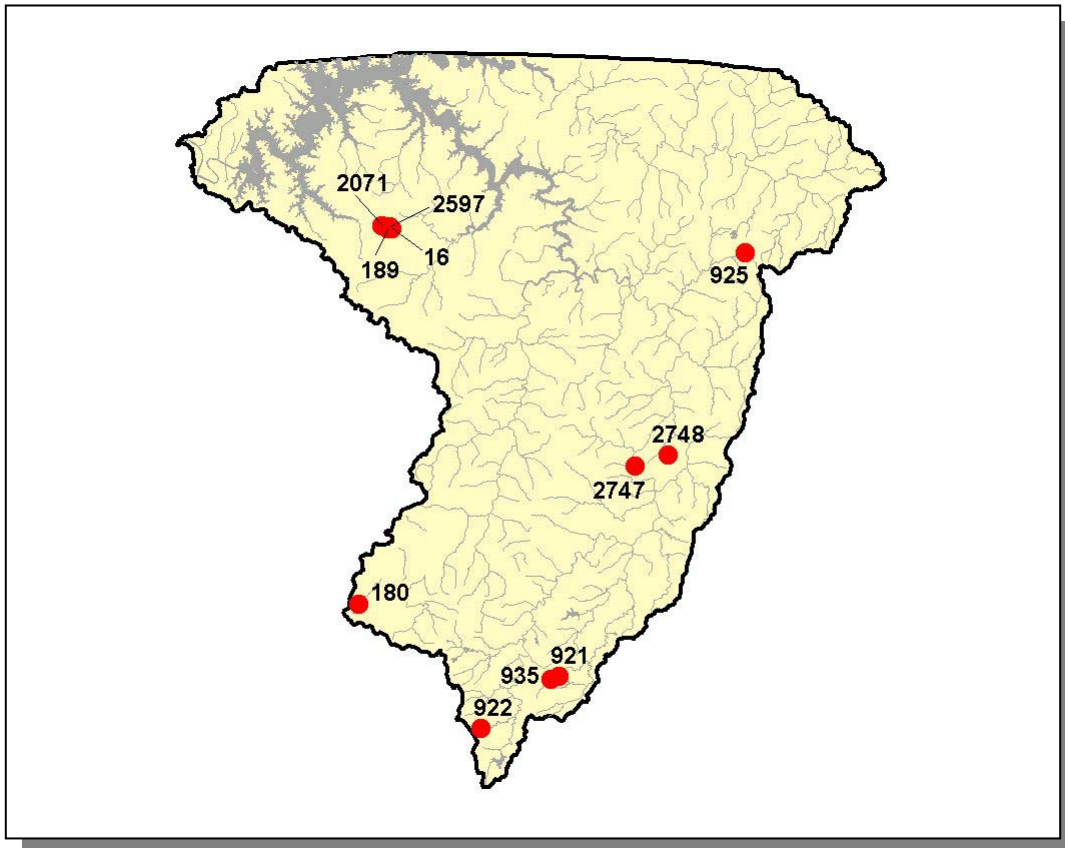
SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
<i>Carpiodes velifer</i>	Highfin carpsucker		D
<i>Etheostoma cinereum</i>	Ashy darter		T
<i>Percina burtoni</i>	Blotchside darter		D
<i>Percina macrocephala</i>	Longhead darter		T
<i>Percina phoxocephala</i>	Slenderhead darter		D
<i>Typhlichthys subterraneus</i>	Southern cavefish		D
<i>Dromas dromas</i>	Dromadary pearlymussel	LE	E
<i>Lampsilis abrupta</i>	Pink mucket	LE	E
<i>Pleurobema oviforme</i>	Tennessee clubshell		
<i>Villosa trabalis</i>	Cumberland bean	LE	E
<i>Lithasia armigera</i>	Armored rocksnail		
<i>Lithasia duttoniana</i>	Helmet rocksnail		
<i>Apocrangonyx nortoni</i>	Norton's cave amphipod		
<i>Cambarus crinipes</i>	Bouchard's crayfish		
<i>Cambarus obeyensis</i>	Obey crayfish		T
<i>Orconectes australis</i>	A crayfish		

**Table 2-4. Rare Aquatic Species in the Collins River Watershed.** Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service, MC, Management Concern for U.S. Fish and Wildlife Service. State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at <http://www.state.tn.us/environment/na/>.



**2.6.B. Wetlands.** The Division of Natural Heritage maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at:

<http://www.state.tn.us/environment/nh/wetlands/>



**Figure 2-12. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Tennessee Portion of the Obey River Watershed.** This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. There may be additional wetland sites in the watershed. More information is provided in Appendix II.



## **2.7. CULTURAL RESOURCES.**

**2.7.A. Nationwide Rivers Inventory.** The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

The most recent version of the Nationwide Rivers Inventory lists portions of four streams in the Tennessee portion of the Obey River Watershed:

East Fork Obey River (RM 12 to RM 38) is a dangerous, rugged stream with a wildly fluctuating gradient in a heavily forested gorge area.

Obey River (RM 0 to RM 7) winds through a scenic valley with alternating pastoral settings and massive, wooded limestone bluffs and supports an excellent fishery.

West Fork Obey River (RM 0 to RM 28) flows through a scenic narrow valley flanked by high, wooded hills in a shallow gorge area.

Wolf River (RM 18 to RM 38) is a scenic stream of historical interest.

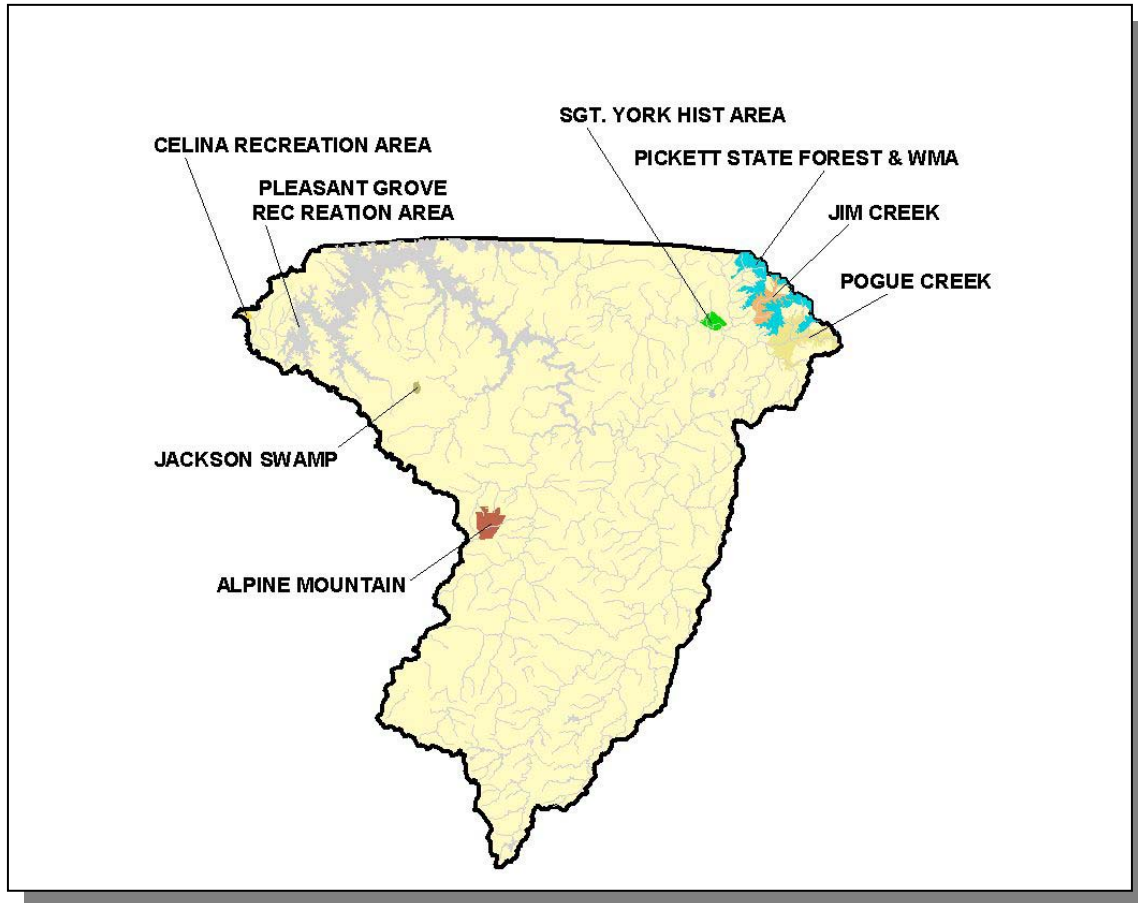
<b>RIVER</b>	<b>SCENIC</b>	<b>RECREATION</b>	<b>GEOLOGIC</b>	<b>FISH</b>	<b>WILDLIFE</b>	<b>HISTORIC</b>	<b>CULTURAL</b>
Obey River	X	X	X	X	X		
EF Obey River	X	X	X	X	X		
WF Obey River	X	X	X		X		
Wolf River	X					X	X

***Table 2-5. Attributes of Streams Listed in the Nationwide Rivers Inventory.***

Additional information may be found online at <http://www.ncrc.nps.gov/rtca/nri/>

**2.7.B. Public Lands.** Some sites representative of the cultural heritage are under state or federal protection:

- Alpine Mountain Wildlife Management Area is a 1,642-acre area managed by TWRA in Overton County.
- Celina Recreation Area (Dale Hollow Dam Recreation Area) is a campground operated by the U.S. Army Corps of Engineers on Dale Hollow Lake. More information may be found at [http://www.tnvacation.com/vendors/dale\\_hollow\\_dam\\_recreation\\_area/](http://www.tnvacation.com/vendors/dale_hollow_dam_recreation_area/).
- Jackson Swamp Wildlife Management Area is a 203-acre area managed by TWRA in Overton County.
- Jim Creek is a 1,541-acre tract located just west of the Pogue Creek tract. The Nature Conservancy bought the land and transferred it to Pickett State Forest. More information may be found at <http://www.nature.org/wherewework/northamerica/states/tennessee/press/press1802.html>.
- Pickett State Forest is an 18,085-acre tract designated as a state forest in 1935, after the Sterns Coal and Lumber Company donated the land in 1933. More information may be found at <http://www.state.tn.us/agriculture/forestry/stateforests/10.html>.
- Pickett State Forest Wildlife Management Area is an 11,000-acre area managed by TWRA in Pickett County.
- Pleasant Grove Recreation Area is a day use area located on Dale Hollow Lake.
- Pogue Creek is a 3,720-acre property adjacent to Pickett State Forest in Fentress County. The land is owned by The Nature Conservancy. More information may be found at: <http://www.nature.org/wherewework/northamerica/states/tennessee/press/press1802.html>.
- Sergeant York State Historic Area includes the York home and gristmill along the Wolf River in Pall Mall. More information may be found at <http://www.state.tn.us/environment/parks/parks/SgtYork>.



**Figure 2-13. Public Lands in the Tennessee Portion of the Obey River Watershed.** Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.

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**2.8. TENNESSEE RIVERS ASSESSMENT PROJECT.** The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

<http://www.state.tn.us/environment/wpc/publications/riv/>

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Ashburn Creek	2			Little Jack Creek	2		
Big Indian Creek	2			Meadow Creek	1	3	
Big Laurel Creek	1			Mitchell Creek	2		
Big Piney Creek	2			Neely Creek	3		
Bills Creek	2			Nettle Carrier Creek	3		
Buffalo Cove Creek	2			Obey River	3	2	1
Caney Creek	3		3	Pogue Williams Creek	2		
Carter Creek	2			Poor Branch Creek	3		
Cowan Branch Creek	2			Poplar Cove Creek	2		
Dry Creek	3			Puncheon Camp Creek	2		
Dry Hollow Fork creek	2			Slate Creek	2		
Eagle Creek	3		2	South Branch Lick Creek	3		
East Fork Obey River	1,2	2,3		Stewart Creek	2		
Hughes Creek	2			Stokes Creek	2		
Hurricane Creek	1	3		West Fork Obey River	1,2	2	3
Irons Creek	2			Wolf River	2,3	2	
Lick Creek	3		3				

**Table 2-6. Stream Scoring from the Tennessee Rivers Assessment Project.**

Categories: NSQ, Natural and Scenic Qualities  
RB, Recreational Boating  
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery  
2. Regional Significance; Good Fishery  
3. Local Significance; Fair Fishery  
4. Not a significant Resource; Not Assessed